

MATH 242 — 24 April 2026

RANDOM WALKS

What do you observe?

What do you wonder?

What would happen if you changed the length of one of the directions?

What is the amount of time that it takes to leave the screen? Is this random?

How long would it take, on average, to get a certain amount of units away from the center?

Would you even get a certain distance away?

What would be the minimum amount of steps to get outside the frame?

Would it ever create an entire grid?

How many 1×1 squares would the random walk make in a given number of iterations?

Given an amount of iterations/steps, what is the average distance from the center?

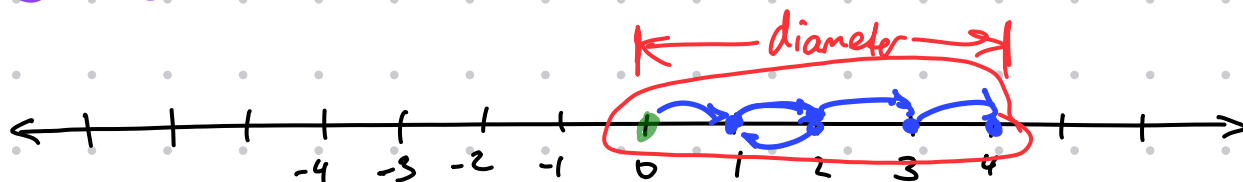
What is the average distance from the center?

Differences between 1D, 2D, and 3D random walks?

How many steps to fill up the grid?

Is there a chance that it will never fill up the grid? On an infinite plane, would the random walk eventually traverse every segment?

1-Dimensional Random Walk



Start at the origin.

At each time step, move left/right with equal probability.

SIMPLE, SYMMETRIC 1-D RANDOM WALK

integer positions

50% left/right

Diameter of a 1-D random walk:

$$\underline{\text{max}} \text{ position} - \underline{\text{min}} \text{ position}$$

How does the ^{average} diameter depend on the number of steps?

